CLAIMS

1. Device (1) for the transmission of power between a shaft (2) of a thermal engine (3) and a shaft (4) of wheels (5), comprising:

- a first and a second electric machine (6, 7), and

- a mechanical assembly (9) connecting with each other the shaft (4) of the wheels (5), the shaft (2) of the engine (3), and shafts (10, 11) of the two electric machines (6, 7), this mechanical assembly (9) being formed by at least two epicycloidal gear trains, these two epicycloidal gear trains comprising each several elements which mesh reciprocally,

characterized in that it comprises,

- a switching device (21.2) comprising means (51, 53) for connecting the shaft (10) of the first machine (6), either to the shaft (2) of the engine (3), or to an element (27) of one of the gear trains of the mechanical assembly (9).

2. Device according to claim 1 characterized in that

- the mechanical assembly (9) is formed by a first and a second epicycloidal gear train (31, 32), these first and second epicycloidal gear trains (31, 32) being connected with each other through their planet carriers (33.1, 33.2), a sun gear (34) of the first gear train (31) being connected to a ring gear (35) of the second gear train (32).

3. Device according to claim 2 characterized in that

- the switching device (21.2) comprises means (51, 53) for connecting the shaft (11) of the first machine (6), either to the shaft (2) of the engine (3), or to the ring gear of the first epicycloidal gear train (31).

4. Device according to any one of claims 1 to 3 characterized in that

- the ratios (R1, R2) of the epicycloidal gear trains (31, 32) are chosen so that, when the rotation speed of the element (27) of one of the gear trains to which the switching device (21.2) is capable of being connected is equal to the rotation speed of the shaft (2) of the engine (3), the rotation speed of the shaft (11) of the second machine (7) is null.

5. Device according to any one of claims 1 to 4, characterized in that it comprises a control device (30) that drives the thermal engine (3), both electric machines (6, 7), and the switching device (21.2).

6. Device according to any one of claims 1 to 5 characterized in that

- the switching device (21.2) comprises a sliding sleeve (51) and a fork (53).

7. Device according to any one of claims 1 to 6 characterized in that it comprises an electrical connection device (8) which connects the electric machines with each other.

8. Device according to claim 7 characterized in that

- the electrical connection device (8) comprises a DC voltage bus (14) and two inverters each connected to one of the electric machines and to this bus (14).

9. Device according to claim 8 characterized in that it comprises a battery connected to the voltage electric bus (14).

10. Device according to one of claims 1 to 9 characterized in that it comprises another switching device (21.1) comprising means (51, 53) for connecting the shaft (4) of the second machine (7), either to the shaft (4) of the second machines (7), either to the shaft (4) of the wheels (5), or to an element (26) of one of the gear trains of the mechanical assembly (9).

11. Process for the transmission of power between a shaft (2) of an engine (3) and a shaft (4) of wheels (5) implementing,

- two electric machines (6, 7), and

- a mechanical assembly (9) connecting with each other shafts (10, 11) of the two electric machines (6, 7), the shaft (2) of the engine (3), and the shaft (4) of the wheels (5), this mechanical assembly (9) comprising at least two epicycloids gear trains, these at least two epicycloidal gear trains comprising each three element which mesh reciprocally, and in which:

- the shaft (10) of the first machine (6) is connected to a an element (27) of one of the epicycloidal gear trains and the shaft (11) of the second machine (7) is connected to the shaft (4) of the wheels (5), in a first mode of operation,

- the shaft (10) of the first machine (6) is connected to element (27) of one of the epicycloidal gear trains and the shaft (11) of the second machine (7) is connected to another element (26) of one of the epicycloidal gear trains, in a second mode of operation,

characterized in that

- in a third mode of operation, the shaft (10) of the first machine (6) is connected to the shaft (2) of the engine (3) and the shaft (11) of the second machine (7) is connected to the other element (26).

12. Process according to claim 11 characterized in that

- one passes from the first mode of operation to the second mode of operation when the rotation speed of the shaft (4) of the wheels (5) is equal to the rotation speed of the element (26) of the assembly (9) to which the first switching device (21.2) is capable of being connected.

13. Process according to claim 12 characterized in that

- the rotation speed of the shaft (10) of the first machine (6) is null.

14. Process according to any one of claims 11 to 13 characterized in that

- one passes from the second mode of operation to the third mode of operation when the rotation speed of the shaft (2) of the engine (3) is equal to the rotation speed of the element (27)of the assembly (9) to which the second switching device (21.2) is capable of being connected.

15. Process according to claim 14 characterized in that

- the rotation speed of the shaft (11) of the second machine (7) is null.

16. Process according to any one of claims 11 to 15 characterized in that

- both electric machines (6, 7) are driven to compensate a difference in speeds between a shaft of one of the machines and the element to be connected at a time of passing from one mode to another, with the help of a control device (30).